

## Design for Precision – Precision & Nanometrology

### Course Overview

This new module on Design for Precision - Precision & Nanometrology is the advanced training programme for this technological area focussing on the design of nano measuring machines, instruments & measurement methods.

### Course Objectives

This course will take you through the most important techniques used for precision design, precision & nanometrology. Once acquainted with these techniques, you will be able to assess your own needs & know how to proceed in solving your design or precision & nanometrology problems.

### Audience

Staff in companies and research institutions involved in design and manufacturing of components and systems:

-Where the precision and reliability of dimensional measurements in the micro- and nanometer range is important

-Who are concerned with documented traceability of such measurements

-Who wish to get an overview of available techniques for such measurements

### Course Content

#### Design for precision

- A 3D coordinate measuring machine for measuring small products in array: objectives, design, geometric error vector & uncertainty of volumetric length measurement  
**Ir J.K Seggelen, Eindhoven University of Technology**
- A novel ultra precision CMM (coordinate measuring machine) based on fundamental design principles: design considerations, novel design, performance evaluation  
**Dr Theo Ruijl, Philips CFT**
- Design of an axially controlled spindle unit for high precision diamond turning: specifications, design considerations, test results  
**Dr Marcel Renkens, Philips CFT**
- Design of a fast tool servo: specifications, actuator parameters, design overview  
**Erik Homburg, Eindhoven University of Technology**

#### Precision & nanometrology

- Topics in precision dimensional metrology: traceability, uncertainty, nanometrology  
**Han Haitjema, Eindhoven University of Technology**
- Principles of roughness measurements: measurements of surface texture, roughness in 2 & 3D, from roughness testers to AFM measurements  
**Han Haitjema, Eindhoven University of Technology**
- Calibration of roughness testers: calibration methods for surface texture instruments  
**Han Haitjema, Eindhoven University of Technology**
- Principles of roundness measurements: types & calibration of roundness testers

**Han Haitjema, Eindhoven University of Technology**

- Principles of displacement interferometry: types of interferometers, accuracy & applications

**Han Haitjema, Eindhoven University of Technology**

- Surface interferometry: accuracy & applications

**Han Haitjema, Eindhoven University of Technology**